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Amended Drawings

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Remarks / Arguments

These drawings have been extensively modified to comply 37 CFR 1.84. The graphs have been changed to black and white line art, and the tables have been modified to be clearer. Also, the equations have been removed from the specification and included with the drawings. Each entry is properly identified with a "FIG." Preceding the drawing number.

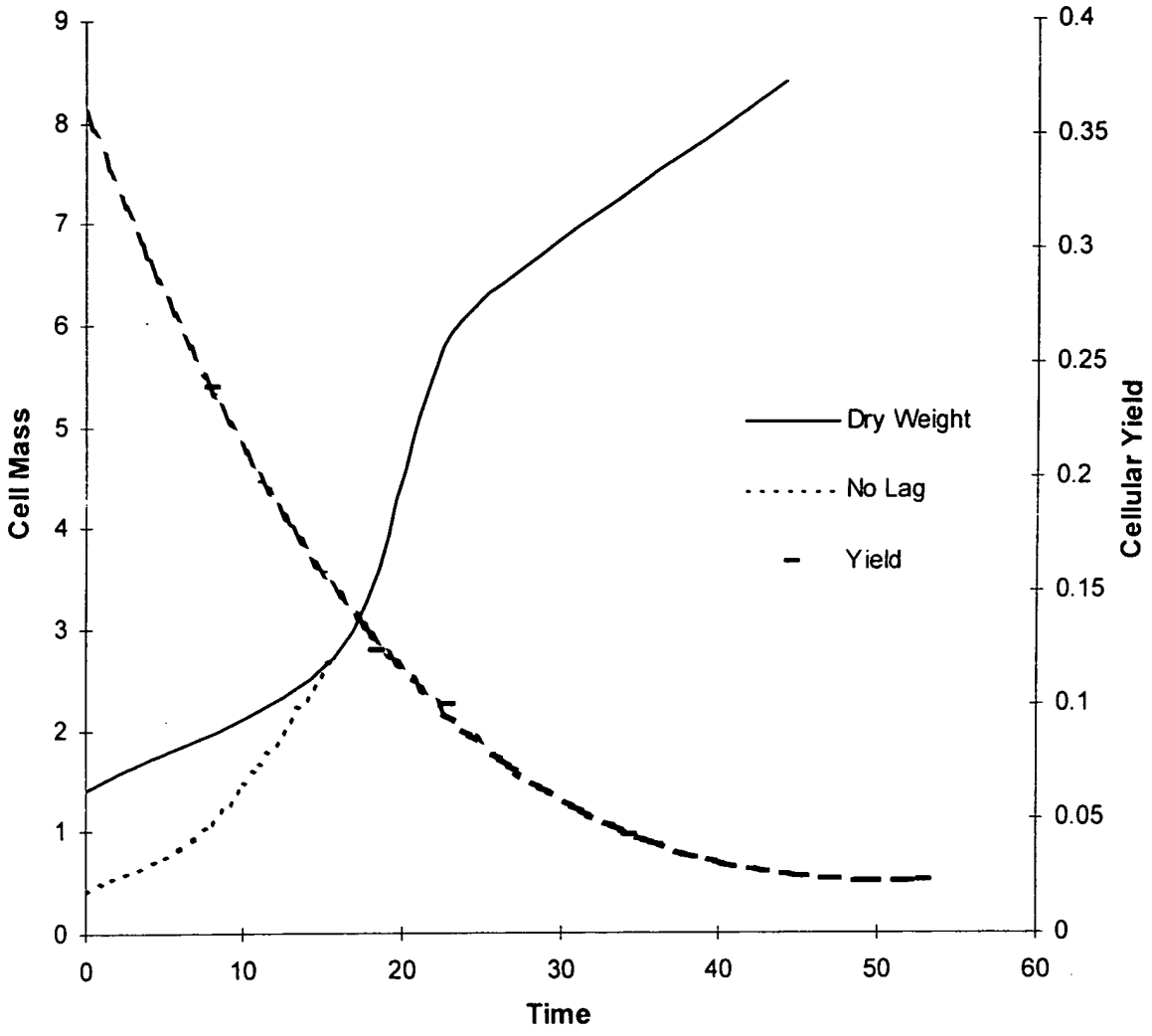

Cell Mass
Cellular Yield
Time
Dry Weight
No Lag
Yield
0
1
2
3
4
5
6
7
8
9
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0
10
20
30
40
50
60

FIG.1

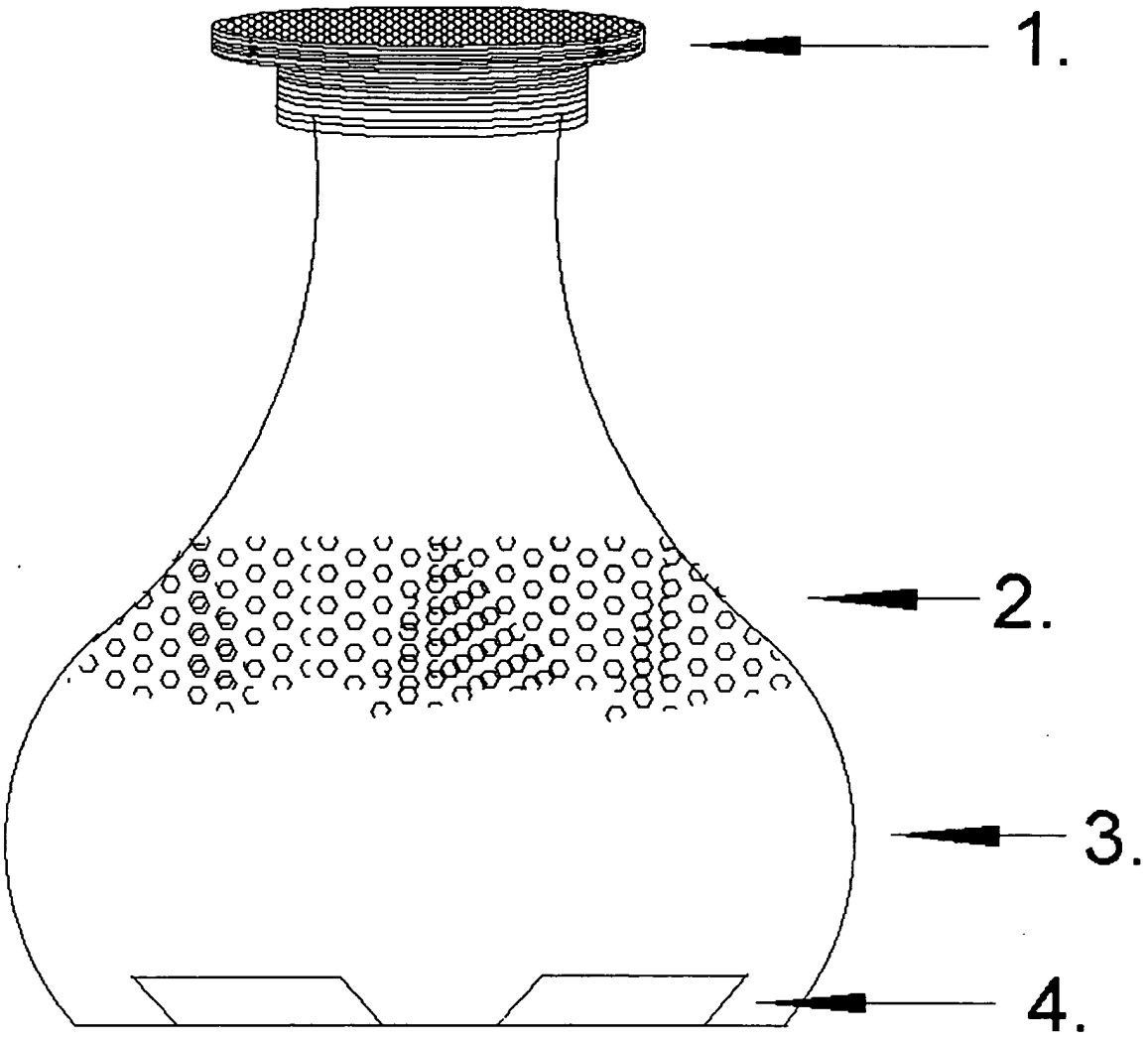


FIG.2

$$\begin{bmatrix} 100 \text{ grams sugar} \\ +3.75 \text{ grams ammonia} \\ +64.95 \text{ grams oxygen} \end{bmatrix} \Rightarrow \begin{bmatrix} 46.88 \text{ grams water} \\ +50.93 \text{ liters carbon dioxide} \\ +30 \text{ grams yeast} \end{bmatrix}$$

FIG.3

Time During Fermentation	Yield (g cells/ g sugar)	Ammonia Needed (grams)	Water Produced (grams)	CO_2 Produced (liters)	Yeast Produced ($C_6H_{10}O_3N$) (grams dry wt.)	Ethanol Produced (C_2H_6O) (grams)*
1st 3rd	.15	18.70	5.1	22.51	15.04	41.19
2nd 3rd	.052	.65	1.79	25.54	5.20	47.68
3rd 3rd	.023	.29	.79	26.44	2.30	49.61
Overall	.05	.626	1.72	25.60	5.00	48.52

FIG.4

$$CO_2 \text{ solubility}(\text{in l } CO_2/\text{l } H_2O) = -1.06556266071 \times \ln(^\circ F) + 5.38424482284$$

FIG.5

$$\frac{\text{Change in yeast mass}}{\text{Change in time}} = \frac{\Delta X}{\Delta t} = \mu \times X$$

$$\ln\left[\frac{X}{X^{\circ}}\right] = \mu \times (t - t_{lag})$$

FIG.6

$$t_d = \frac{\ln (2)}{\mu}$$

FIG.7

$$\text{Ratio}\left[\frac{l\,CO_2}{g\ \text{sugar}}\right] = 0.271599039164 - (0.310674946821 \times \text{Yield})$$

FIG.8

$$\text{Specific Gravity} = (3.652010359\,96 \times 10^{-4}) \times S + 0.999953627005$$

FIG.9

$$Y = \frac{\Delta X}{\Delta S}$$

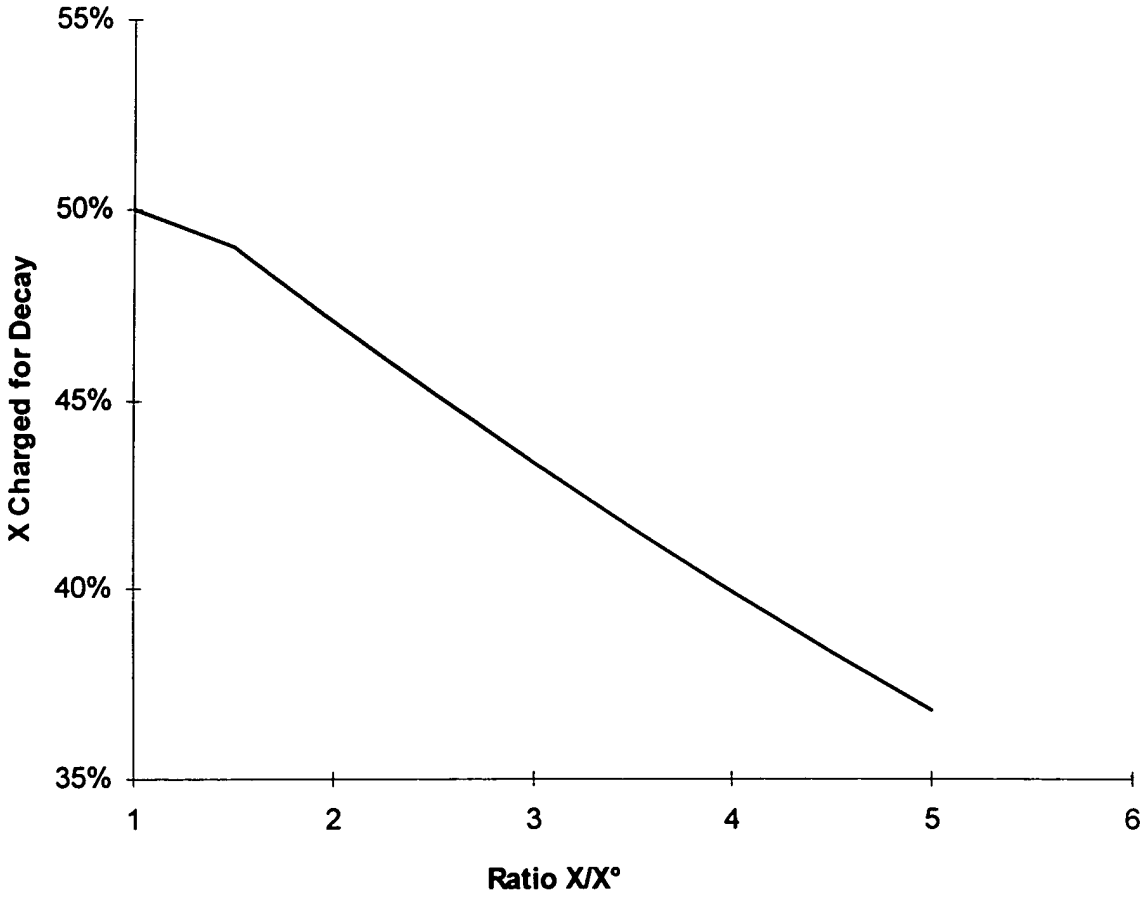
FIG.10

$$\left[\frac{\Delta X\,(for\ \text{decay})}{\Delta time}\right] = b \times X$$

FIG.11

$$Y = \left[\frac{\Delta X}{\Delta S}\right] = \left[\frac{5.14794}{24.644}\right] = 0.20889 \frac{g X}{g S}$$

FIG.12



$$Xchrgd = 0.5040764476 09 \times EXP(-0.0816252748703 \times Ratio)$$

FIG.13

Sample Name	Time (hours)	X weight (grams)	S.G. Reading (g S/l, see EQSG)	Measured CO2 Flow (ml / min)
t_0	0	1.415	183.59	0
t_1	15.75	2.73	178.11	3.944
t_2	21.03	5.1	158.94	12.344
t_3	24.5	6.18	147.99	15.074
t_4	44.08	8.38	95.965	7.234

FIG.14

A Interval	B Observed New X	C Total hours of interval	D Mass lost from starting X decay
$t_0 - t_1$	1.315	15.75	0.089145
$t_1 - t_2$	2.37	5.28	0.0576576
$t_2 - t_3$	1.08	3.2	0.06528
$t_3 - t_4$	2.2	19.58	0.4840176

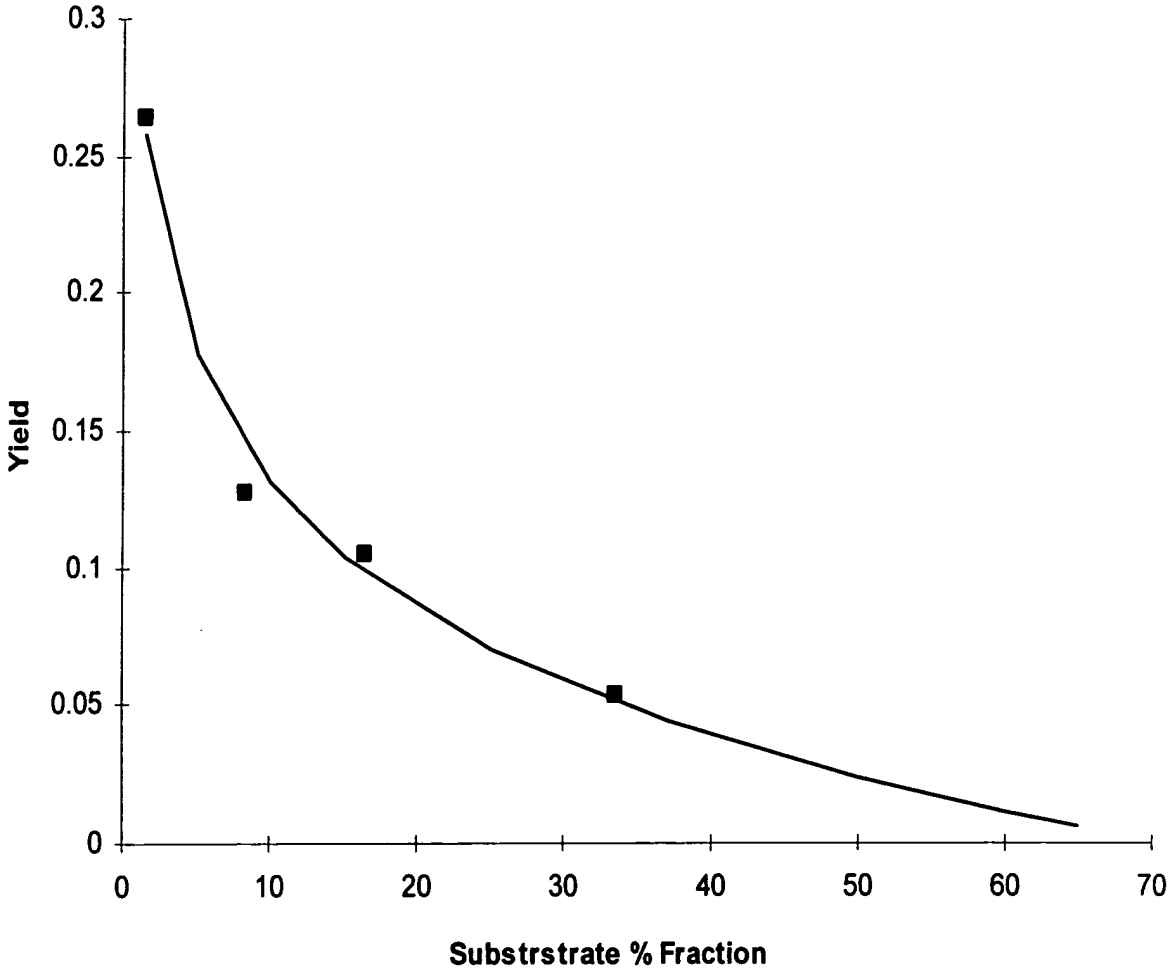
A Interval	E Sub-total new mass (B + D)	F Ratio new X/Start X (Starting X + E) / Starting X	G Charge what new mass b? (EQXchrgd)
$t_0 - t_1$	1.404145	1.9923	0.471
$t_1 - t_2$	2.4276576	1.88925	0.475
$t_2 - t_3$	1.14528	1.22457	0.5
$t_3 - t_4$	2.6840176	1.434307	0.493

A Interval	H Decay of new mass (E x G x C x .004)	I Total new mass yield (E + H)	Amount of sugar used (g/l)
$t_0 - t_1$	0.0416652	1.4458102	5.48
$t_1 - t_2$	0.024354261	2.45201186	19.17
$t_2 - t_3$	0.007329792	1.152609792	10.95
$t_3 - t_4$	0.103634643	2.7876522	52.025

A Interval	J Average % S consumed	K Yield g X / g S	L Yield (fm curve) g X / g S
$t_0 - t_1$	1.4925	0.263833977	0.258098264
$t_1 - t_2$	8.206	0.127908809	0.144275124
$t_2 - t_3$	16.409	0.105261168	0.097997972
$t_3 - t_4$	33.56	0.053582936	0.05021553

A Interval	M % of actual Yield
$t_0 - t_1$	97.83%
$t_1 - t_2$	112.80%
$t_2 - t_3$	93.10%
$t_3 - t_4$	93.72%

FIG.15



$$Y = \left\{-6.678143050038 \times 10^{-2} \times [\ln(\%used)]\right\} + 0.284841059276$$

FIG.16

Interval	% fraction of S	Yield fm EQ%used	Ratio fm EQYld (l CO_2/g X)
t_0 - t_1	1.4925	0.2580973	0.79324921
t_1 - t_2	8.206	0.14427497	1.52663404
t_2 - t_3	16.409	0.097998	2.3594534
t_3 - t_4	33.56	0.0502161	5.00801093

Interval	Total new X (grams)	liters CO_2 predicted fm model (g X x Ratio)	liters CO_2 predicted by actual Yield
t_0 - t_1	1.445803	1.1469	1.1192
t_1 - t_2	2.452006	3.7433	4.2872
t_2 - t_3	1.1526299	2.71968	2.5095
t_3 - t_4	2.787623	13.9604	12.9849

Interval	Average measured CO_2 (ml / min)	liters CO_2 predicted fm avg of measured CO_2 flow rate at this interval
t_0 - t_1	1.972	1.8635
t_1 - t_2	8.144	2.58
t_2 - t_3	13.709	2.6321
t_3 - t_4	11.154	13.1037

FIG.17